Cognition

PSYC 2040

W4: (better) learning and association

logistics

- no office hours today

- late work policy change

- exit ticket reminder

- Week 4 quiz will open tomorrow

Late Work Policy

Sometimes, life doesn't go as planned and you have way too much going on to turn things in on time. That is **OKAY**! This course has the following policies for late work:

1. Each student has **3 "flex" days** that they can use at their discretion throughout the semester for specific assignments (see points 2 and 3). You can use all 3 days at once for a single assignment and turn in one assignment 3 days late (with no questions asked), OR you can spread the love across different assignments.
2. Flex days may ONLY be used for weekly assignments (quizzes and/or project work).
3. If an assignment is a GROUP assignment (as will be the case for project work), EACH member of the group will need to count off their individual flex day for the flex day to count.
4. Flex days may NOT be used for in-class assessments or activities.
5. If you need to turn in work late and do not have any flex days left, I will consider extensions based on legitimate reasons, which ONLY include verified illnesses and/or family emergencies. In these cases, you are encouraged to reach out to me at least 24 hours **in advance** of the due date.
6. Using ONE flex day means you get a 24-hour extension. Please note that this is a strict extension.
7. Work that is handed in late beyond the flex days or without an **approved** extension will automatically incur a 10% penalty per day, with a lowest possible score of 50% of the original points.
8. **To request a flex day**, you can leave a comment on your submitted assignment on Canvas. If your work is late and no comment is made on Canvas, the late penalty will be automatically applied.

schedule before next milestone

- ## week 3
  - group contract
  - converge on topic
- ## week 4
  - everyone reads 2 <u>review</u> papers/podcasts + writes mini summary
- ## week 5:
  - go over each other's work
  - decide on final paper/podcast for SPARK
  - divide SPARK sections
- ## week 6
  - proofread! edit!

| 3	W: February 12, 2025	**Project: Group Contract due**
4	Th: February 13, 2025	W4 continued…
4	Su: February 16, 2025	**Week 4 Quiz due**
4	Su: February 16, 2025	**Jennifer's Office Hours (7-9 pm, Kanbar 200)**
5	T: February 18, 2025	W5:Categorization
5	Th: February 20, 2025	**President Safa Zaki Guest Lecture!**
5	Su: February 23, 2025	**Week 5 Quiz due**
6	M: February 24, 2025	**Project: SPARK due**
6	T: February 25, 2025	W6: Language
6	Th: February 27, 2025	W6 continued…
6	Su:March 2, 2025	**Week 6 Quiz due**
7	T: March 4, 2025	W7: Loose Ends / Midterm review
7	W: March 5, 2025	**Jennifer: Midterm Review (4.30-6.30 pm, Kanbar 200)**
7	Th: March 6, 2025	**Midterm Exam**

today's agenda

- lingering limitations
  - eyewitness testimonies
  - flashbulb memories
- speed review: associations & conditioning
- better learning!

Loftus, Miller, and Burns (1978)

- Q 17: Did another car pass the blue Datsun while it was stopped at the...
  - STOP sign (Consistent)
  - YIELD sign (Inconsistent)
  - Intersection (Neutral)

- longer retention intervals led to worse performance

- providing inconsistent or misleading information produced the least accuracy overall, but the impact was worse when the questionnaire was delayed

- the weaker the original trace, the easier it is to alter
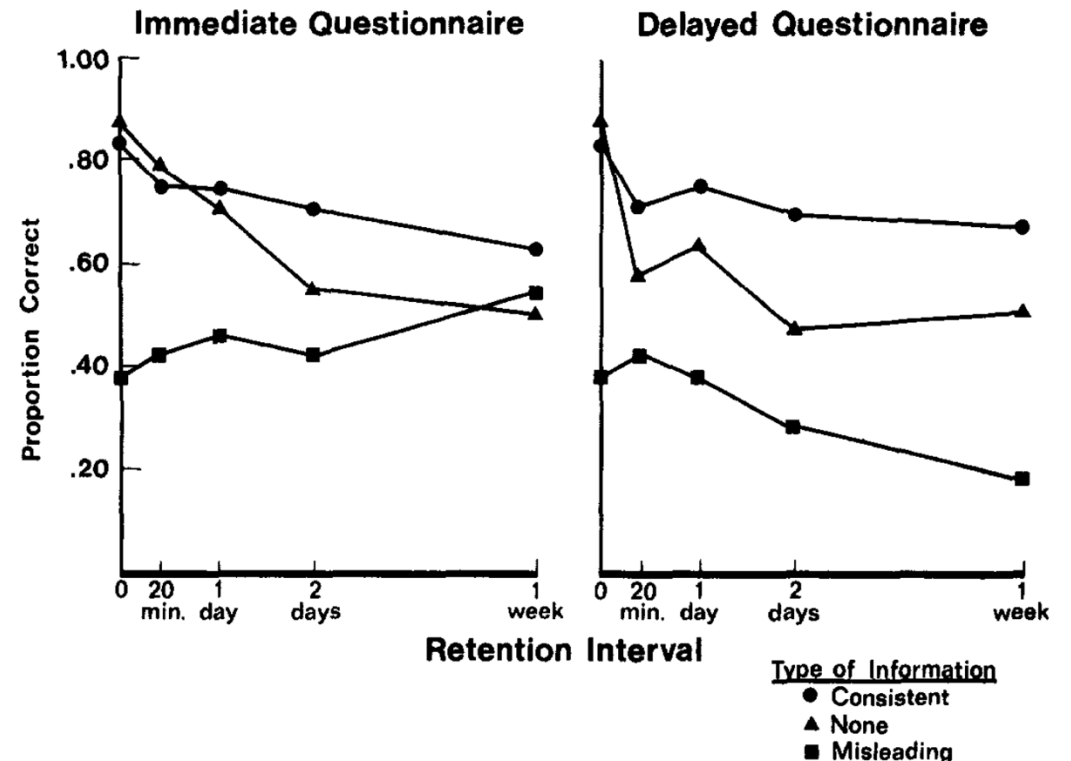
eyewitness testimony

- **at the time of crime**: race, exposure duration, lighting, retention interval, stress, weapon focus

- **during initial identification**: nature of lineup, suggestive questions, similarity, memory strength

- **after initial identification**: reinforcing memories, repeated exposure

https://www.youtube.com/watch?v=u-SBTRLoPuo
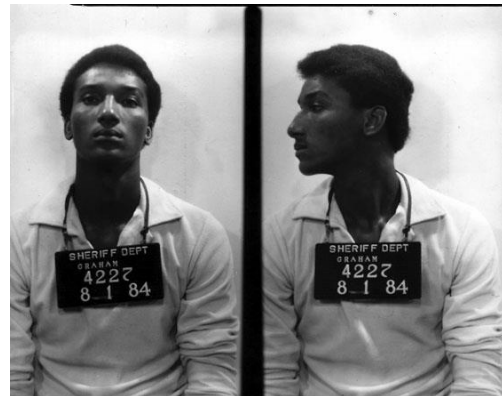
cognition and legal system

- admissibility of evidence in cases is governed by the Federal Rules of Evidence, which have largely remained unchanged since 1975 (Yilmaz, Shen, & Wixted, 2023)

- eyewitness testimony played a role in almost 70% of 375 wrongful convictions overturned by DNA evidence since 1989 (Innocence Project, 2023)

- even without suggestibility, the act of testing a witness' testimony creates a memory trace that can be later reinforced

- the first identification is therefore the purest and most indicative of innocence (or guilt)

- there is a systematic predictive relationship between confidence and accuracy during early lineups (Wixted, Mickes, et al., 2016)
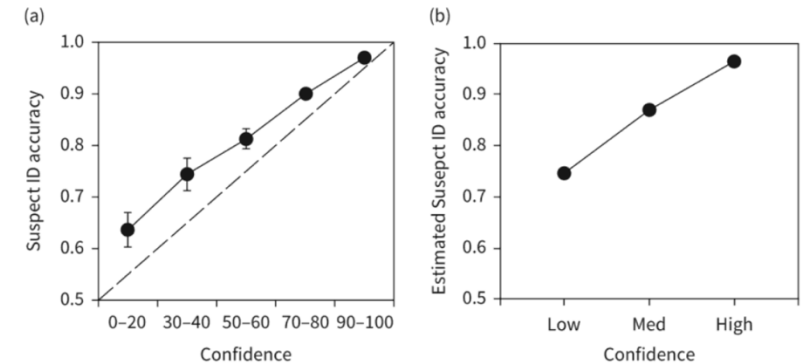

Figure 4.7 (a) CAC plot showing suspect identification accuracy (proportion correct) averaged across 15 studies with comparable scaling on the confidence (x-) axis (Wixted & Wells, 2017). (b) Estimated suspect identification accuracy (proportion correct) as a function of confidence for the data from the Houston Police Department field study assuming equal base rates (Wixted, Mickes, et al., 2016).

"pristine" eyewitness identification

- only one suspect per lineup

- suspect should not stand out in the lineup

- caution that the offender might not be in the lineup

- use double-blind testing (administrator of lineup should not know who the suspect is)

- collect a confidence statement at the time of the identification

Most Similar to Bobby Poole
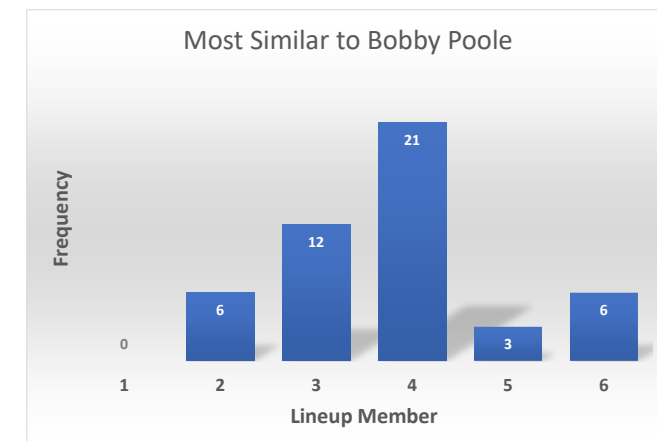
flashbulb memories

- *autobiographical* memories for salient, emotionally charged events
- feel very vivid and are reported with high confidence, but typically show memory declines and lack specific details over time
- factors that affect flashbulb memories
  - retroactive interference: new information presented from multiple sources
  - rehearsal and spacing: makes them more vivid and strengthened

flashbulb memories: age differences

Age-Related Differences in Flashbulb Memories: A Meta-Analysis

Sarah J. Kopp, Laura E. Sockol, and Kristi S. Multhaup
Davidson College

Recent meta-analyses reveal age-related declines in short-term memory (STM), working memory, associative memory, prospective memory, face memory, recognition, and recall. The present meta-analyses extend this work beyond predominantly laboratory-based tasks to a naturalistic phenomenon. *Flashbulb memories* are vivid autobiographical recollections for the circumstances in which one learns of a distinct event that may be surprising, emotional, or personally important (the *reception event*). The existing literature on aging and flashbulb memories includes inconsistent findings. The present meta-analyses included 16 studies ($N = 1898$) that examined flashbulb memory in nonclinical samples of younger adults (below age 40 years) and older adults (above age 60 years). Findings, after exclusion of an outlier, suggest a small-to-moderate age-related impairment in flashbulb memory scores ($k = 14$, Hedges' $g = -0.30$, 95% CI [-0.45, -0.15], $p < .001$) that was not moderated by study characteristics. After exclusion of an outlier, older adults' flashbulb memories were also significantly less consistent across time than younger adults' ($k = 7$, Hedges' $g = -0.29$, 95% CI [-0.47, -0.11], $p = .002$). Secondary analyses investigated age-related differences in the presence and consistency of canonical categories of flashbulb memories and encoding and rehearsal variables associated with flashbulb memory formation and retention. Age-related differences were found only for consistency of memory for ongoing activity at the time of the reception event, favoring younger adults ($k = 3$, Hedges' $g = -0.40$, 95% CI [-0.65, -0.15], $p = .002$). Overall, these findings are consistent with age-related impairment in flashbulb memory formation and retention.

Table 1
Characteristics of Included Studies

Study	Country	Study design	Event
Bohn and Berntsen (2007)	Germany	CS	Fall of Berlin Wall
Cohen, Conway, and Maylor (1994)	United Kingdom	CQ	Resignation of Margaret Thatcher
Davidson, Cook, and Glisky (2006)	United States	CQ	September 11, 2001 terrorist attacks
Davidson and Glisky (2002) Study 2	United States	CQ	Death of Mother Theresa
Denver, Lane, and Cherry (2010)	United States	CS	September 11, 2001 terrorist attacks
Gerdy, Multhaup, and Ivey (2007)	United States	CQ	September 11, 2001 terrorist attacks
Greene, Loftus, Grady, and Levine (2018)	Ireland	CQ	May 2018 abortion referendum
Kensinger, Krendl, and Corkin (2006)	United States	CQ	Explosion of Columbia Shuttle
Kvavilashvili, Mirani, Schlagman, Wellsted, and Kornbrot (2009), Study 1	United Kingdom	CS	Death of Princess Diana
Kvavilashvili et al. (2009) Study 2	United Kingdom	CS	Death of Princess Diana
Kvavilashvili et al. (2009) Study 3	United Kingdom	CQ	September 11, 2001 terrorist attacks
Otani et al. (2005)	Japan	CQ	Nuclear accident in Ibaraki
Tekcan et al. (in press), Study 1	Turkey	NR	Challenger shuttle explosion
Tekcan and Peynircioğlu (2002)	Turkey	CS	Death of President Ozal
Wolters and Goudsmit (2005)	Netherlands	CS	September 11, 2001 terrorist attacks
Yarmey and Bull (1978)	United States and Canada	CS	Assassination of John Fitzgerald Kennedy

Note. CS = cross-sectional; CQ = cross-sequential; NR = not reported.

- moderate age impairment in a recent meta-analysis (Kopp et al., 2020)

flashbulb memories: recent work

Flashbulb Memories and Memories for Personal Events: Their Role in Social Categorization and Identification

Travis G. Cyr, Kayla Toscano, and William Hirst

Department of Psychology, The New School for Social Research, United States

Does the act of remembering or not remembering convey socially relevant information? The present work explored this question by examining the role flashbulb memories (FBMs) and memories for personal (MPEs) events play in social categorization and social identification. Study 1 investigated the extent to which Americans believe FBMs of both domestic and international public events and memories for life-script events should be remembered by an American or a Briton. Study 2 built on Study 1 and examined whether these normative expectations serve as a basis for identifying someone as "American," "American immigrant," "Black American," "female," "religious," or "politically conservative." Results indicate that FBMs and MPEs affect social categorization and identification in distinctive ways. The role of FBMs as markers of social identity is discussed.

A day that America will remember: flashbulb memory, collective memory, and future thinking for the capitol riots

Nawël Cheriet ✉ ⓘ, Meymune Topçu ✉, William Hirst, Christine Bastin & Adrien Folville

📄 Full Article   🖼 Figures & data   📑 References   ➕ Supplemental   ❝ Citations   📊 Metrics   🖨 Reprints & Permissions

ABSTRACT

This study explores the topics of flashbulb memory, collective identity, future thinking, and shared representations for a public event. We assessed the memories of the Capitol Riots, which happened in Washington DC, on 6 January 2021. Seventy Belgian and seventy-nine American citizens participated in an online study, in which they freely recalled the unfolding of Capitol Riots and answered questions regarding their memory. Inter-subjects similarity of recalled details was analysed using a schematic narrative template (i.e., the event, the causes and the consequences). Results revealed that representations of the event, and its causes were more similar among Belgians compared to Americans, whereas Americans' representations of the consequences showed more similarity than Belgians'. Also, as expected, Americans reported more flashbulb memories (FBMs) than Belgians. The analysis underlined the importance of rehearsal through media and communication in FBM formation. This research revealed a novel relation between FBM and future representations. Regardless of national identity, participants who formed an FBM were more likely to think that the event would be remembered in the future, that the government should memorialise the event, and that a similar attack on the Capitol could happen in the future compared to participants who did not form FBM.

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associative learning

- Pavlovian conditioning: learning associations between two stimuli

- likely driven by synaptic plasticity

- "neurons that fire together wire together" / Hebbian learning: Dr. Carla Schatz
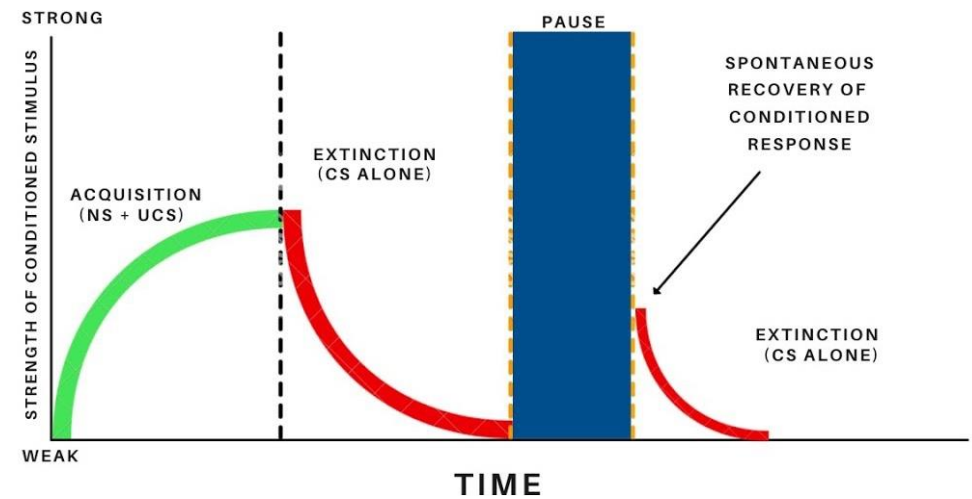
- hardware / physical level explanation
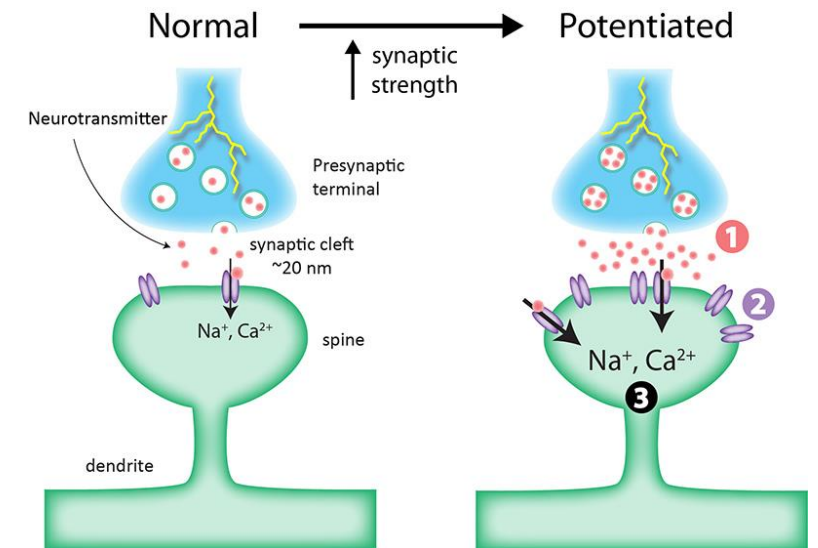
learning via association: review

- unconditioned stimulus (UCS)
  - evokes response without prior learning
- neutral stimulus (NS)
  - does not evoke a response
- unconditioned response (UCR)
  - default response to UCS
- conditioned stimulus (CS)
  - begins to trigger the unconditioned response
- conditioned response (CR)
  - newly learned response

activity: identify the terms!

- unconditioned stimulus (UCS)
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- Every morning, Tarun wakes up to the sound of his alarm clock ringing. He groggily stumbles out of bed and makes his way to the kitchen, where he begins his morning ritual of brewing coffee. As he starts the coffee maker, the aroma of freshly brewed coffee fills the air. Tom eagerly pours himself a cup and takes a sip, reveling in the rich, bold flavor. Over time, Tom notices that just hearing the sound of his alarm clock ringing triggers a craving for coffee, even before he takes his first sip.

*ChatGPT generated

the state of things

- we learn by association

- we have several limitations that impede or hamper this learning
  - attention-based limitations
  - memory-based limitations

- how can we enhance learning?

key memory principles

- levels of processing: Craik and Lockhart proposed the idea that the strength and quality of encoding determine later memory

- transfer-appropriate processing: cognitive processing at both encoding AND retrieval matters for memory
  - transfer inappropriate processing (TIP): mismatch in what happened during encoding vs. retrieval
  - transfer appropriate processing (TAP): match in what happened during encoding vs. retrieval

levels of processing

- memory traces are stronger when the original information is processed in a meaningful way
- shallow (structural, phonemic conditions) vs. deep (semantic, self-reference) processing

Table 1
Examples of the Rating Tasks

Task	Cue question	Manipulation
Structural	Big letters?	The adjective was either presented in the same size type as the question or twice as large.
Phonemic	Rhymes with xxxx?	xxxx was a word that either rhymed or did not rhyme with the adjective.
Semantic	Means same as yyyy?	yyyy was either a synonym or unrelated word to the presented adjective.
Self-reference	Describes you?	Subjects simply responded *yes* or *no* to indicate the self-reference quality of the presented adjective.

| Rating | Rating task | | | | |
	Structural	Phonemic	Semantic	Self-reference	
	Mean recall				Total
yes	.28	.34	.65	1.78	3.05
no	.06	.34	.68	1.06	2.14
Total	.34	.68	1.33	2.84	5.19

memory experiment

- review the procedures
- what do you think it could be measuring?

TIP/TAP > levels of processing

- claim: the tasks performed at encoding and retrieval take precedence over the nature of processing (shallow vs. deep)

- evidence: Morris, Bransford, and Franks (1977)
  - participants encoded words in a semantic or rhyming context
  - the test phase was either a standard recognition test or a rhyming-based recognition test

acquisition mode

| The ____ flew in the sky | EAGLE |
| ____ rhymes with legal. | EAGLE |
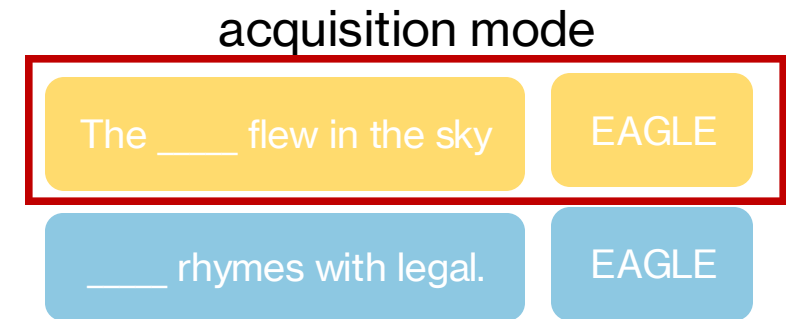
standard recognition

EAGLE	OLD
	NEW
LAUGH	OLD
	NEW

match

rhyming recognition

REGAL	OLD
	NEW
LAUGH	OLD
	NEW

mismatch

TIP/TAP > levels of processing

- claim: the tasks performed at encoding and retrieval take precedence over the nature of processing (shallow vs. deep)

- evidence: Morris, Bransford, and Franks (1977)
  - on standard test, recognition was higher for semantic vs. rhyme words
  - on rhyme test, recognition was higher for rhyme vs. semantic words

Bransford et al.'s results and plot

Acquisition mode	Recognition test	
	Standard	Rhyming
Semantic–Yes	.844 (.155)[a]	.333 (.224)
Rhyme–Yes	.633 (.239)	.489 (.252)

recognition performance
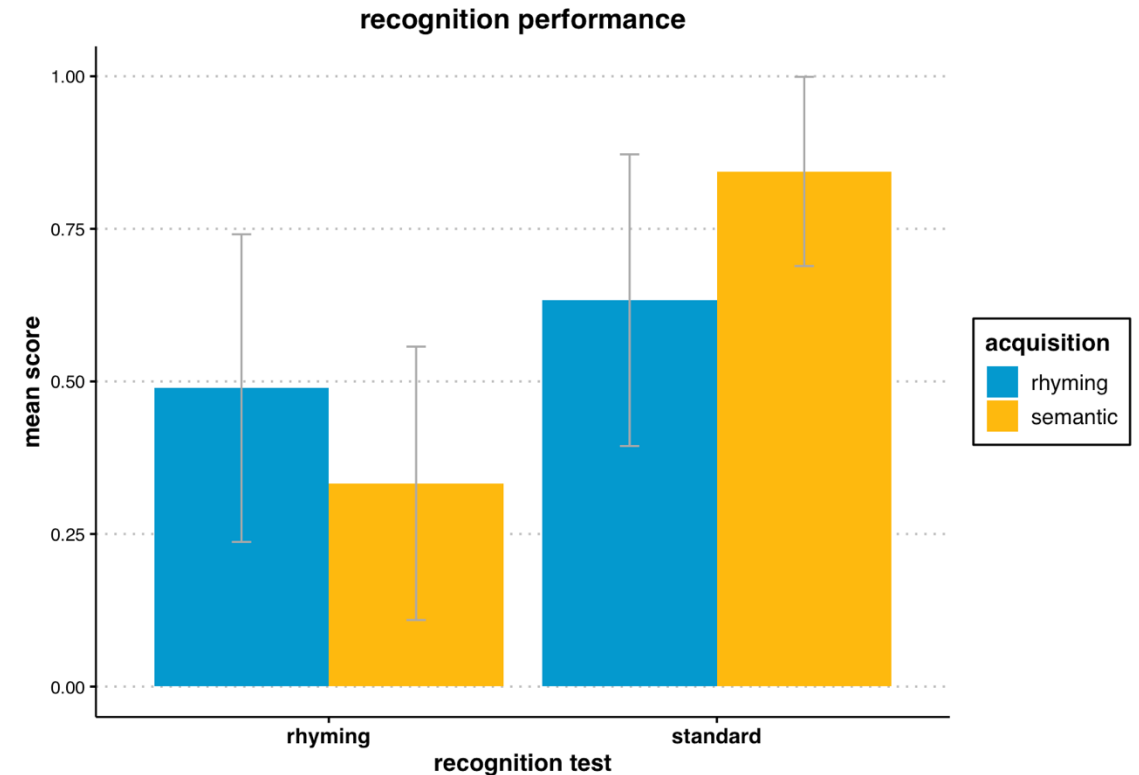
what **helps** learning?

- matching encoding and retrieval context (*TAP*)

- repetition (practice), spacing, and testing

- elaborative encoding
  - self-reference
  - generation, production, enactment

- distinctiveness

- learning from errors

distinctiveness: Von Restorff

```
      laf -- rig
        # -- +
      dok -- pir
       89 -- 46
red square -- green square
      zül -- dap
        S -- B
      tög -- fem
```

- memory is better for distinctive items

- evidence: Von Restorff (1933)
    - participants were tested on 5 lists
    - lists used counterbalancing to ensure that effects were not influenced by the characteristics of items of order, but only the composition of the list (context)
    - "isolated" pairs were better remembered than massed items across all lists, i.e., distinctive pairs were better remembered

LIST 1

4 NONSENSE }MASSED
1 SYMBOL
1 NUMBER
1 COLOR   }ISOLATES
1 LETTER

distinctiveness: Von Restorff

```
laf -- rig
  # -- +
dok -- pir
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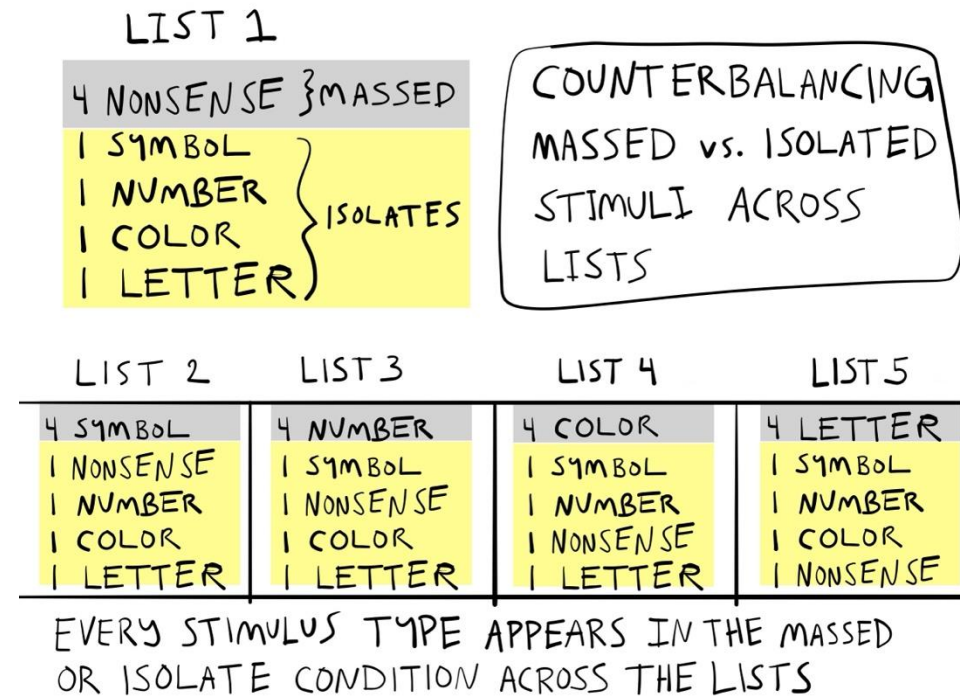
meaningfulness: self-reference

- relating information to yourself improves retention

- evidence: Rogers et al. (1977)
  - participants encoded lists of adjectives via 4 conditions (structural, phonemic, semantic, and self-reference)
  - recall for adjectives was highest for the self-reference condition

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generation, production, enactment

- generating information can improve memory performance
- evidence: Slamecka and Graf (1978)
  - participants either generated (lamp-L???) or read words
  - generation was achieved via different methods:
    - associate (lamp-light)
    - category (ruby-diamond)
    - opposite (long-short)
    - synonym (sea-ocean)
    - rhyme (save-cave)
  - probability of recognizing a word was higher for generated words, compared to words that were read for all types of words
- production: read out loud vs. silently
- enactment: acted/imagined vs. not
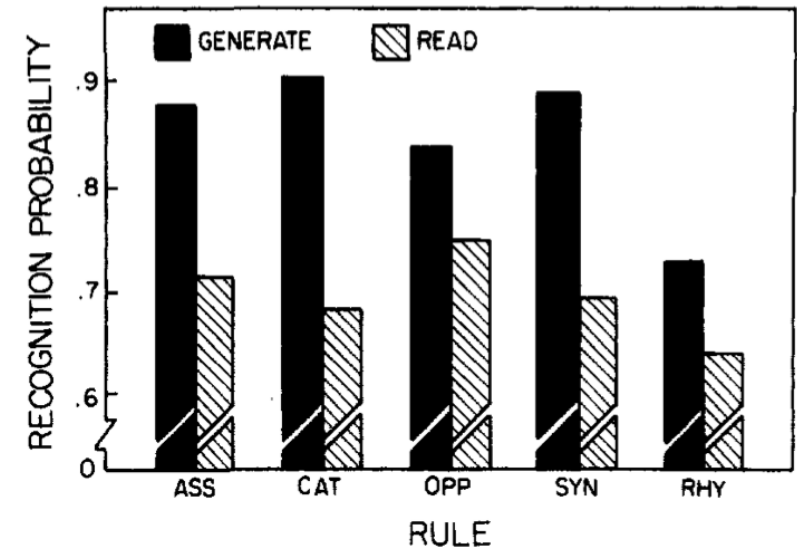
Figure 1. Mean recognition probabilities for each condition for each rule of Experiment 1. (ASS = associate; CAT = category; OPP = opposite; SYN = synonym; RHY = rhyme.)
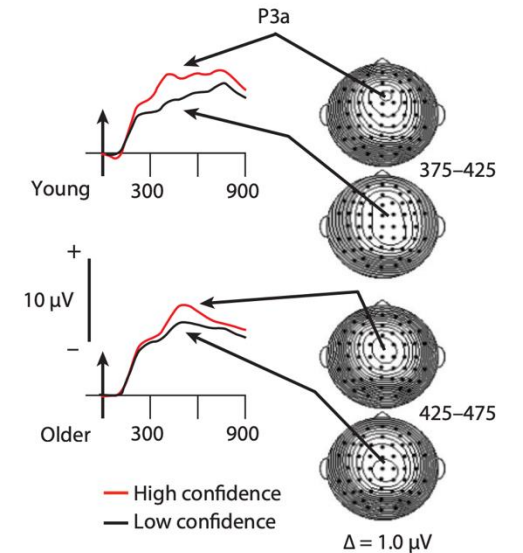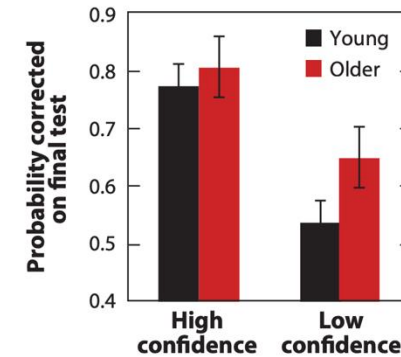
learning from errors

- Kornell et al. (2009) manipulated whether participants generated errors or were provided the correct answer (error-free) in a related word pair memory task

- on the final test, participants remembered the correct answers considerably better when they had generated an error than when they had not

- Huelser & Metcalfe (2012): to be beneficial, the guess needs to be somewhat informed rather than a shot in the dark
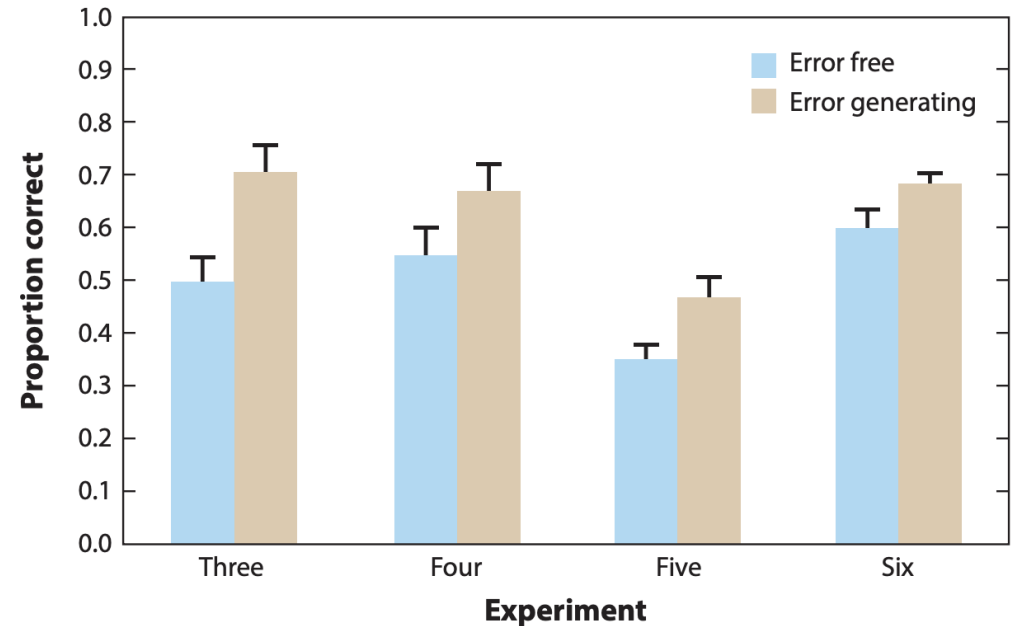
learning from errors: feedback

- corrective feedback is crucial
- hypercorrection: high-confidence errors are surprising and increased attention is paid to corrective feedback to such errors

learning from errors: metacognition

- Huelser & Metcalfe (2012): participants were generally unaware of the benefit of error generation (even in face of evidence!)
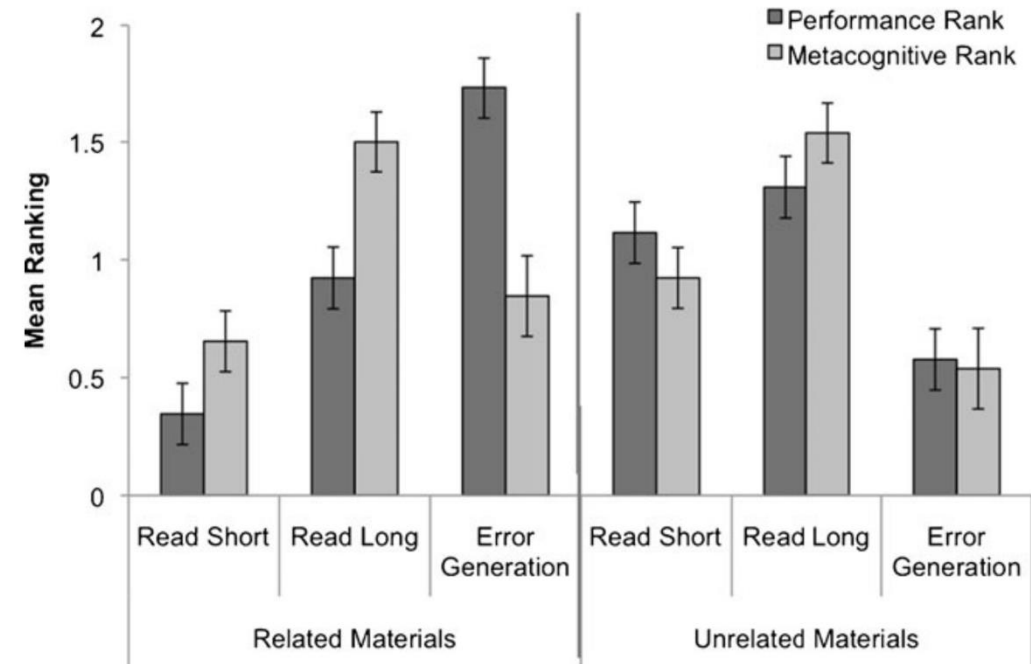
exit ticket & next class

- complete your exit ticket!
- categorization!